Contest I and III **Written Restrictions 2015-2016**

Competition A: Open to all Students

Permutations, Combinations, and Probability (Conference Graphing Calculator)

Special Directions: All probabilities are to be written as reduced fractions.

Contest I	Permutations and combinations only (may include circular permutations)
Contest III	Probability. Finite, Independent, and mutually exclusive events.
Contest V	(if selected) Expectations, repeated trials and conditional probability are acceptable.

Conic Sections (No Calculator)

GENERAL	No degenerate forms or rotations; specify form of answer in question; be able to find vertices, foci, and centers (by completing the square); major, minor, transverse, and conjugate axes.
Contest I	Parabola (including latus rectum (focal chord) and directrix), and ellipse only. Contest III Hyperbola (including equations of asymptotes) and eccentricity of all conic sections are included.

Competition B: Closed to Seniors

Circles (Conference Graphing Calculator)

Diagrams are not necessarily drawn to scale.

Contest I	Non-coordinate approach. Include measures and properties of angles, arc measures, chords, secants, and tangents.
Contest III	Segments, sectors, arc lengths, area and circumference; may include one coordinatized question.

Arithmetic & Geometric Progressions (Conference Graphing Calculator)

Contest I	nth terms; ratio and difference; finite sums and infinite sums; means; no application problems
Contest III	may include one application problem.

Competition C: Closed to Juniors and Seniors

Systems of Equations (No Calculator)

Special Directions: Where appropriate, write a value as a reduced fraction

Contest I	2 x 2 linear systems only with integral coefficients and rational solutions; describe type of system: consistent/independent, consistent/dependent, or inconsistent; No applications
Contest III	2 x 2 linear systems with rational coefficients and solutions; only one 2 x 2 literal is acceptable; 3 x 3 with integral coefficients and reasonable rational solutions.
Contest V	One application requiring the solving of a 2 x 2 system may be included.

Factoring (No Calculator)

Contest I	Greatest common factor; difference of two squares; sum and difference of cubes; general trinomials; at most one of which is impossible (write original polynomial or write "prime"); no grouping.
Contest III	Grouping (4 terms: 2 & 2, 1 & 3, 3 & 1); trinomials and cube square decision; no missing term; no grouping over four terms.

Competition D: Open to Freshmen Only

Linear Equations and Inequalities (No Calculator)

Contest I	May include rational coefficients, but not necessarily. No literals; answers should be in simplified form. Avoid excessive fractions.
Contest III	May include at most one literal equation; simple common factoring in an equation; no literals in inequalities.

Order of Operations/Evaluations (No Calculator)

Special Directions: Where appropriate, write a value as a reduced fraction

Contest I	addition, subtraction, multiplication, division of rational numbers; evaluation of expressions with degree no greater than 3; may include square roots; no negative exponents
Contest III	add negative exponents, uniquely defined operations

Contest II and IV **Written Restrictions 2015-2016**

Competition A: Open to all Students

Functions and Limits (Conference Graphing Calculator)

Special Direcitons: No need to rationalize answers to limits

Contest II — Evaluation of algebraic functions, comparison of graphs [f(x + 2) vs f(x)], basic limits (substitution, factor/cancel, infinite), include piecewise functions

Contest IV — Left-hand/right-hand limits; "no limit" problems acceptable ("does not exist" – DNE); Include trigonometric, logarithmic, and transcendental functions.

Trigonometric Equations (Conference Graphing Calculator)

GENERAL — Specify answers in radians ($0 \le x < 2\pi$) or degrees ($0° \le x < 360°$); exact answers required unless otherwise stated in the problem; linear equations and factorable quadratic equations are acceptable; no applications

Contest II — Reciprocal identities, Pythagorean identitites. Even-odd properties.

Contest IV — Double and Half-angle formulas.

Competition B: Closed to Seniors

Right Triangle Trigonometry (Conference Graphing Calculator)

Contest II — Pythagorean Theorem; Include exact values for 30-60-90 and 45-45-90, or give sine, cosine, or tangent ratio of one angle; similarity; no tables

Contest IV — include trig values of angles evaluated by calculator (degrees only); Other plane figures that can be partitioned into right triangles; may include one application.

Congruence and Similarities (Conference Graphing Calculator)

Contest II — No applications; no volume; include areas; Pythagorean Theorem; 30-60-90 and 45-45-90 ratios

Contest IV — May include one application problem; include volume..

Competition C: Closed to Jrs and Srs

Quadratic Equations (No Calculator)

Special Directions: Where appropriate, write a value as a reduced fraction

Contest II — Quadratic formula, factoring, and rational coefficients; no complex roots

Contest IV — May include sums/products of roots; no complex roots and only rational coefficients.

Inequalities (No Calculator)

Special Directions: Where appropriate, write a value as a reduced fraction

Contest II — First-degree; basic absolute value; second-degree factorable; conjunctions; disjunctions

Contest IV — Rational terms; higher degrees in factored form

Competition D: Open to Freshmen Only

Charts, Graphs, & Data (No Calculator)

Each contest will have TWO charts, graphs, and/or set of data. There will be a two point question and a three point question based upon the given. Questions 1 and 3 are worth 2 points each; questions 2 and 4 are worth 3 points each.

Contest II — Graphs may include histograms, bar graphs, circle graphs, scatter plot, and line plots.

Contest IV — Add mean, median, and mode of a reasonable set of data; also stem and leaf, box & whiskers, outliers.

Systems of Equations (No Calculator)

Special Directions: Where appropriate, write a value as a reduced fraction

Contest II — Linear over integers; 2 x 2 systems only; no literals, no word problems; no specific method of solution; answer sheet should look like: x =_____, y =_____.

Contest IV — Include 3 x 3; but no 3 x 3 literal systems. 3 x 3 systems must have integral coefficients and answers; basic 2 x 2 literals with monomial coefficients; no word problems.

MATHLETES ORAL TOPICS
2015-2016

CONTESTS 1 & 3

Exponential and Logarithmic Equations/Applications (jr/sr)

Finite Mathematics w/Applications	1. 4.1-4.2	pp. 206-222
Lial, Hungerford, Holcomb	3. 4.3-4.4	pp. 222-246
Peason-Addison Wesley, 2007, 9th Ed	5. 4.1-4.4	pp. 202-246
ISBN: 0-321-38672-8		

Combinatorics (jr/sr)

Discrete Mathematics	1. 8.1-8.2	pp. 402-415
Dossey, Otto, Spence, Vanden Eynden	3. 8.3-8.4	pp. 416-428
Peason-Addison Wesley, 2006, 5th Ed.	5. 8.1-8.4	pp. 402-428
ISBN: 0-321-30515-9		

Equations of Lines (fr/so)

Finite Mathematics w/Applications	1. 2.2	pp. 83-95
Lial, Hungerford, Holcomb	3. 2.3	pp. 96-107
Peason-Addison Wesley, 2007, 9th Ed	5. 2.2-2.3	pp. 83-107
ISBN: 0-321-38672-8		

Note: Following Contest 2, all coaches will receive an email which contains a table. Oralists in Equations of Lines are expected to put the values into L1 and L2 on their calculator BEFORE prep time at contest 3. One of the oral questions will involve the use of this table.

CONTESTS 2 & 4

Functions (jr/sr)

Reference Provided	2. Ch. 1
	4. Ch. 2
	5. Ch. 1, 2

Recurrence Relations (jr/sr)

Discrete Mathematics	2. 9.1-9.2	pp. 458-481
Dossey, Otto, Spence, Vanden Eynden	4. 9.3	pp. 482-505
Peason-Addison Wesley, 2006, 5th Ed.	5. 9.1-9.3	pp. 458-505
ISBN: 0-321-30515-9		

Note: There will be NO proofs or verifications by induction in any of the Recurrence Relations questions. Students may use the 'conclusions' reached in the reference without the use of induction to verify/prove.

Rational Expressions, Exponents, and Radicals (fr/so)

Finite Mathematics w/Applications	2. 1.4	pp. 26-32
Lial, Hungerford, Holcomb	4. 1.5	pp. 32-45
Peason-Addison Wesley, 2007, 9th Ed	5. 1.4-1.5	pp. 26-45
ISBN: 0-321-38672-8		